CLAIMS:

1. A method of identifying and detecting channels in a multiplexed communications network, comprising the steps of:

modulating each channel to be identified with a respective combination of at least two continuous dither tones; and

detecting the dither tones to detect said channels, the step of detecting the dither tones comprising performing a frequency analysis operation to detect dither tones of a channel having a relatively high power, and performing coherent averaging of the frequency analysis results over a plurality of frequency analysis operations to detect dither tones of a channel having a relatively low power.

2. A method as described in claim 1, wherein the step of performing the frequency analysis operation comprises performing a discrete transform operation.

3. A method as described in claim 2, wherein the step of performing the discrete transform operation comprises performing a Fast Fourier Transform (FFT) operation.

4. A method as described in claim 2, wherein the step of performing the discrete transform comprises performing one or more of the following transforms: Discrete Cosine Transform (CDCT), Discrete Sinus Transform (DST), Inverse Discrete Cosine Transform (IDCT), Inverse Discrete Sinus Transform (IDST), Fast Walsh Transform (FWT), and Fast Hadamard Transform (FHT).

5. A method as claimed in claim 1 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises

modulating each channel alternately, with a predetermined periodicity, with the respective combination of dither tones.

6. A method as claimed in claim 1 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel alternately, with a predetermined periodicity, with a respective one of two continuous dither tones.

7. A method as described in claim 1, wherein the steps of modulating and detecting the respective dither tones are synchronized.

8. A method as described in claim 5, wherein the steps of modulating and detecting the respective dither tones are synchronized by using a global clock in the network so that the time intervals of modulating and detecting the respective dither tones have same duration and start at the instant of switching dither tone frequencies.

9. A method as claimed in claim 6 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

10. A method as claimed in claim 1 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel with a respective one of at least three continuous dither tones with a cyclic repetition and a predetermined periodicity.

11. A method as claimed in claim 1 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

12. A method as claimed in claim 3 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel alternately, with a predetermined periodicity, with a respective one of two continuous dither tones.

13. A method as claimed in claim 12 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

14. A method as claimed in claim 3 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel with a respective one of at least three continuous dither tones with a cyclic repetition and a predetermined periodicity.

15. A method as claimed in claim 14 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

16. A method of identifying optical channels in an optical WDM network, comprising the steps of:

continuously generating dither tones at a plurality of frequencies; and

intensity modulating each of a plurality of optical channels to be identified with a respective selection of at least two of said dither tones in a cyclically repeated sequence and with a predetermined periodicity.

17. A method as claimed in claim 16 wherein each optical channel to be identified is intensity modulated alternately with each of a respective two of said dither tones.

18. A method as claimed in claim 17 and further comprising the steps of detecting intensity modulation of at least one optical signal, detecting dither tones of the optical signal using a frequency analysis operation , and performing coherent averaging of results of the frequency analysis operation over a plurality of frequency analysis operations.

19. A method as claimed in claim 18 wherein the frequency analysis operation comprises an FFT (Fast Fourier Transform) operation.

20. A method as claimed in claim 16 and further comprising the step of detecting intensity modulation of at least one optical signal, detecting dither tones of the optical signal using a frequency analysis operation to provide amplitude and phase results for dither tone frequencies, and coherently averaging said results over a plurality of frequency analysis operations.

21. A method as claimed in claim 20 wherein the frequency analysis operation comprises an FFT (Fast Fourier Transform) operation.

22. A modulating arrangement comprising:

a plurality of continuous dither tone sources;

a selector for selecting at least two dither tones from said sources in a cyclically repeated sequence and with a predetermined periodicity;

a modulator for modulating a channel of a multiplexed communications network with the cyclically repeated sequence of dither tones from the selector; and

a feedback loop for maintaining a predetermined modulation depth of the channel by the modulator.

23. A modulating arrangement as claimed in claim 22 wherein the selector is arranged for selecting alternately each of two dither tones from said sources.

24. A modulating arrangement as claimed in claim 23, further comprising a link to a global clock so that to provide alternate selection and switching of the dither tones at predetermined instances of time.

25. A modulating arrangement as claimed in claim 22 wherein the multiplexed communications network comprises an optical WDM network and the modulator comprises an optical modulator for intensity modulating an optical channel of the optical WDM network.

26. A modulating arrangement as claimed in claim 25 wherein the selector is arranged for selecting alternately each of two dither tones from said sources.

27. Apparatus comprising a plurality of modulating arrangements as claimed in claim 25, each arranged to modulate a respective one of a plurality of optical channels having respective wavelengths with a respective cyclically repeated sequence of dither tones thereby to provide each optical channel with a respective channel identity, and an optical multiplexer for multiplexing together the plurality of optical channels including their respective channel identities.

28. A detection arrangement for use in a multiplexed communications network including a modulating arrangement as claimed in claim 22, the detection arrangement comprising a detector for detecting the modulation by said modulator, an FFT (Fast Fourier Transform) processor for providing FFT results

for dither tone frequencies, and an arrangement for coherently averaging the FFT results over a plurality of FFT operations.

29. A detection arrangement as claimed in claim 28 wherein the detector comprises an optical detector for detecting intensity modulation of an optical signal in an optical WDM network.

30. A detection arrangement as claimed in claim 28 wherein the modulating and detecting arrangements are synchronized by using same clock so that the time intervals of modulating and detecting the respective dither tones have same duration and start at the instant of switching dither tone frequencies.